Space Weather Forecast

Issued on Wednesday, 06 September 2023 at 13:11 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: R1 Minor Radio Blackouts Likely 06 Sep, then Chance throughout.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activity has been Moderate in the past 24 hours with a couple of Moderate-flares. There are currently seven sunspot groups on the visible disc - with two main regions of interest where spots are showing complex configurations and have shown some activity in the past day. New regions are in the process of emerging from the northeast limb.

A large Coronal Mass Ejection (CME) was observed at 05/1400 UTC, leaving the Sun from the far-side of the disc, beyond the northwest limb. Initial analysis of this feature does not show an Earth-directed component. A couple of CMEs were observed from over the western limb, but aren't expected to be Earth-directed. A smaller and slower CME was seen emerging in the southwest from a region that saw a Common-class flare. This may have some Earth-directed component, with an estimated arrival time of late on Day 4 (09 Sep).

Solar Wind / Geomagnetic Activity: The solar wind environment was initially at slow-ambient levels, before a marked rise was observed around 05/1438 UTC, with speeds rapidly increasing to Slightly Elevated. This is considered to indicate the arrival of a CME that left the Sun on 01 September. Wind speeds remained at Slightly Elevated levels before declining back to background levels. The Interplanetary Magnetic Field (IMF) was Weak until 05/1438 UTC at which point it jumped to Moderate. IMF returned to weak levels around 05/1900 UTC. The north-south component weakly fluctuated for much of the period.

The net result of the above solar measures was for Quiet (Kp0-2) geomagnetic activity, then Active (Kp4) or Unsettled (Kp3) periods between 05/1500-2100 UTC.

Energetic Particles / Solar Radiation: No solar radiation storms were observed.

Four-Day Space Weather Forecast Summary

Solar Activity: Moderate-class flares are Likely Day 1 (06 Sep), most likely associated with the two more complex sunspot regions. There is then an ongoing Chance of Moderate-class flares that increases slightly on Day 4 with the anticipated arrival of a returning active region, coupled with the increased complexity of current spots.

Solar Wind / Geomagnetic Activity: The geomagnetic forecast is for a peak Slight Chance of Active (Kp4) intervals within the current UTC day in association with a high speed stream. Further coronal hole influences may see some enhancement in upcoming days, but confidence is low. The CME that emerged from the southwest may have some Earth-directed component, with an estimated arrival time of late on Day 4 (09 Sep), giving the potential for some enhancement to Active or G1 Minor Storm levels (Kp4-5). In the absence of further CMEs,

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activity should remain largely Quiet to Unsettled (Kp0-3).

Energetic Particles / Solar Radiation: No solar radiation storms are expected.

Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	5	5	5	10
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	Yes	60	40	40	50
Very Active	R3 to R5 X	No	2	2	2	2

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	5	2	2	5
Very Active	≥ S3 *	No	1	1	1	1

* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)

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